```
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSSSSS
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSSSSS
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSSSSS
RRR         RRR  MMMMMM   MMMMMM  SSS
RRR         RRR  MMMMMM   MMMMMM  SSS
RRR         RRR  MMMMMM   MMMMMM  SSS
RRR         RRR  MMM   MMM   MMM  SSS
RRR         RRR  MMM   MMM   MMM  SSS
RRR         RRR  MMM   MMM   MMM  SSS
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSS
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSS
RRRRRRRRRRRR     MMM         MMM     SSSSSSSSS
RRR   RRR        MMM         MMM              SSS
RRR   RRR        MMM         MMM              SSS
RRR   RRR        MMM         MMM              SSS
RRR      RRR     MMM         MMM              SSS
RRR      RRR     MMM         MMM              SSS
RRR      RRR     MMM         MMM              SSS
RRR         RRR  MMM         MMM  SSSSSSSSSSSS
RRR         RRR  MMM         MMM  SSSSSSSSSSSS
RRR         RRR  MMM         MMM  SSSSSSSSSSSS
```

```
**FILE**ID**RMSODISPL                                    I 10

RRRRRRRR    MM      MM    SSSSSSSS    000000    DDDDDDDD      IIIIII      SSSSSSSS  PPPPPPPP    LL
RRRRRRRR    MM      MM    SSSSSSSS    000000    DDDDDDDD      IIIIII      SSSSSSSS  PPPPPPPP    LL
RR      RR  MMMM  MMMM  SS          00      00  DD      DD      II      SS          PP      PP  LL
RR      RR  MMMM  MMMM  SS          00      00  DD      DD      II      SS          PP      PP  LL
RR      RR  MM  MM  MM  SS          00    0000  DD      DD      II      SS          PP      PP  LL
RR      RR  MM  MM  MM  SS          00    0000  DD      DD      II      SS          PP      PP  LL
RRRRRRRR    MM      MM    SSSSSS    00  00  00  DD      DD      II        SSSSSS    PPPPPPPP    LL
RRRRRRRR    MM      MM    SSSSSS    00  00  00  DD      DD      II        SSSSSS    PPPPPPPP    LL
RR  RR      MM      MM          SS  0000    00  DD      DD      II              SS  PP          LL
RR  RR      MM      MM          SS  0000    00  DD      DD      II              SS  PP          LL
RR    RR    MM      MM          SS  00      00  DD      DD      II              SS  PP          LL          ::::
RR    RR    MM      MM          SS  00      00  DD      DD      II              SS  PP          LL          ::::
RR      RR  MM      MM  SSSSSSSS      000000    DDDDDDDD      IIIIII    SSSSSSSS    PP          LLLLLLLLLL  ::::
RR      RR  MM      MM  SSSSSSSS      000000    DDDDDDDD      IIIIII    SSSSSSSS    PP          LLLLLLLLLL  ::::

LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

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```
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```

```
0000        $BEGIN  RMSODISPL,000,RM$RMS,<DISPATCH FOR DISPLAY OPERATION>
0000
0000 ;
0000 ;*****************************************************************************
0000 ;*                                                                           *
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0000 ;*                                                                           *
0000 ;*                                                                           *
0000 ;*****************************************************************************
0000 ;
0000 ;++
0000 ; FACILITY: RMS32
0000 ;
0000 ; ABSTRACT:
0000 ;               This module is the highest level control routine
0000 ;               to perform the $DISPLAY function.
0000 ;
0000 ; ENVIRONMENT:
0000 ;               STAR processor running STARLET EXEC.
0000 ;
0000 ; AUTHOR: L F Laverdure,          CREATION DATE: 19-Jan-1978
0000 ;
0000 ; MODIFIED BY:
0000 ;
0000 ;       V03-021 JWT0175         Jim Teague              12-Apr-1984
0000 ;               Complete the implementation of access mode ATRs.
0000 ;
0000 ;       V03-020 JWT0173         Jim Teague              1-Apr-1984
0000 ;               Disable access mode ATRs for now.
0000 ;
0000 ;       V03-019 JWT0172         Jim Teague              28-Mar-1984
0000 ;               Put byte specifying EXEC mode access in last longword
0000 ;               of ATR work area.
0000 ;
0000 ;       V03-018 DAS0001         David Solomon           25-Mar-1984
0000 ;               Add $ATRDEF.
0000 ;
0000 ;       V03-017 DGB0028         Donald G. Blair         22-Mar-1984
0000 ;               Have RM$XAB_SCAN process protection xab AFTER call to
0000 ;               ACP as part of implementation of ACL's.
0000 ;
```

```
                 0000     58 ;       V03-016 JWT0166           Jim Teague              20-Mar-1984
                 0000     59 ;               Use access-mode attributes in those places where
                 0000     60 ;               RMS requests the ACP to probe user structures.
                 0000     61 ;               Also use a dynamically-allocated scratch page for
                 0000     62 ;               accumulating ATRs for QIOs.
                 0000     63 ;
                 0000     64 ;       V03-015 DGB0009           Donald G. Blair         01-Mar-1984
                 0000     65 ;               Make changes related to ACP calls as part of the
                 0000     66 ;               restructuring necessary to implement access mode
                 0000     67 ;               protected files.  Also use RM$XABOPN_ARGS rather than
                 0000     68 ;               XABOPN_ARGS.
                 0000     69 ;
                 0000     70 ;       V03-014 RAS0214           Ron Schaefer            22-Nov-1983
                 0000     71 ;               Fix RAS0210 to set R10 more carefully.
                 0000     72 ;               Fix network $DISPLAY for task-to-task.
                 0000     73 ;
                 0000     74 ;       V03-013 RAS0210           Ron Schaefer             4-Nov-1983
                 0000     75 ;               Revise this in several ways:
                 0000     76 ;                   Use the real FWA for storage;
                 0000     77 ;                   Use RM$RET_DEV_CHAR to get device characteristics;
                 0000     78 ;                   Properly store the RFM and ORG fields.
                 0000     79 ;
                 0000     80 ;       V03-012 RAS0193           Ron Schaefer            20-Sep-1983
                 0000     81 ;               Increase size of attribute buffer to 16.
                 0000     82 ;               This is a temp fix; real solution is to use existing FWA.
                 0000     83 ;
                 0000     84 ;       V03-011 RAS0163           Ron Schaefer            27-Jun-1983
                 0000     85 ;               Eliminate reference to RM$BASIC_ERR.
                 0000     86 ;
                 0000     87 ;       V03-010 TSK001            Tamar Krichevsky        12-Jun-1983
                 0000     88 ;               Fix broken branches to journaling routines.
                 0000     89 ;
                 0000     90 ;       V03-009 LJA0071           Laurie J. Anderson      29-Apr-1983
                 0000     91 ;               Fix problem with displaying terminals
                 0000     92 ;               When displaying FAB, fill in ALQ field, too.
                 0000     93 ;               Note: Still need to handle shared file case in filling in ALQ
                 0000     94 ;
                 0000     95 ;       V03-008 RAS0148           Ron Schaefer            26-Apr-1983
                 0000     96 ;               Add initial support for extended XABPRO.
                 0000     97 ;
                 0000     98 ;       V03-007 LJA0060           Laurie J. Anderson      21-Feb-1983
                 0000     99 ;               Add the display of RAB and FAB fields which are available
                 0000    100 ;               in the IRAB and IFAB and so could be displayed.
                 0000    101 ;               Add the display of the NAM block, if linked to FAB, from
                 0000    102 ;               the permanent FWA space.  Add some more comments.
                 0000    103 ;
                 0000    104 ;       V03-006 LJA0051           Laurie J. Anderson      13-Jan-1983
                 0000    105 ;               Add ability to display RAB, and add "wild ISI" support
                 0000    106 ;               for Context Extraction.  "Wild ISI" support involves the
                 0000    107 ;               return of the "next ISI" in the linked list of IRAB's.
                 0000    108 ;               This value is returned in the STV.
                 0000    109 ;
                 0000    110 ;       V03-005 JWH0115           Jeffrey W. Horn         22-Oct-1982
                 0000    111 ;               Fix bug in V03-004 to reference correct register
                 0000    112 ;               for FIB in READ_ATTR.
                 0000    113 ;
                 0000    114 ;       V03-004 JWH0108           Jeffrey W. Horn         28-Sep-1982
```

```
0000  ;               Add processing for $XABJNL.
0000  ;
0000  ;       V03-003 KBT03xx         Keith B. Thompson       10-Aug-1982
0000  ;               Remove $FRBDEF
0000  ;
0000  ;       V03-002 KBT0178         Keith B. Thompson       23-Aug-1982
0000  ;               Reorganize psects and rename entry point to single '$'
0000  ;
0000  ;       V03-001 CDS0003         C Saether       30-Mar-1982
0000  ;               Correct display of isam xab's so that BIO connect
0000  ;               after BRO open works.
0000  ;
0000  ;       V02-015 CDS0002         C Saether       22-Jan-1982
0000  ;               Use RM$ALLOC_BUF routine to allocate/deallocate
0000  ;               buffers so that global buffers are handled correctly.
0000  ;
0000  ;       V02-014 CDS0001         C Saether       29-Aug-1981
0000  ;               Remove references to BCB's.  Use BLB's instead.
0000  ;
0000  ;       V02-013 JAK0063         J A Krycka      28-AUG-1981
0000  ;               Add support for network $DISPLAY.
0000  ;
0000  ;       V02-012 MCN0007         Maria del C. Nasr       12-May-1981
0000  ;               Define new symbol for old length of backup date and time XAB.
0000  ;
0000  ;       V02-011 REFORMAT        Frederick E. Deen, Jr.      28-Jul-1980
0000  ;               This code was reformatted to adhere to RMS standards
0000  ;
0000  ;       V010    CDS0060         C Saether       6-Dec-1979
0000  ;               Fixup relative to V009.  Use RM$BDBALLOC_ALT to allocate
0000  ;               buffer, etc., for ISAM.
0000  ;
0000  ;       V009    CDS0051         C Saether       2-Nov-1979
0000  ;               Use RM$ALLOC_BUF to handle allocate buffer for
0000  ;               ISAM org only - others don't need it
0000  ;
0000  ;       V008    DMB0002         D M Bousquet    13-Feb-1979
0000  ;               Modified to always allocate a BDB, BUFFER and BCB (if SHARED)
0000  ;               and release everything we allocated at finish
0000  ;
0000  ;       V007    DMB0001         D M Bousquet    10-Jan-1979
0000  ;               Changed RM$RETBDB to a CACHE and RELEASE CALL
0000  ;
0000  ;       V006    CDS0001         C D Saether     2-Jan-1979
0000  ;               Resolve out of range BRANCH
0000  ;
0000  ;       V005    RAN0002         R A Newell      6-Sep-1978
0000  ;               RMS-32 ISAM modifications.  Processing of summary, key
0000  ;               and area xabs
0000  ;
0000  ;       V004    JAK0001         J A Krycka      27-Aug-1978
0000  ;               Revise NETWORK ERROR processing
0000  ;
0000  ; REVISION HISTORY:
0000  ;
0000  ;       L F Laverdure,      10-Oct-1978
0000  ;       X0003 - Deletion of call to CHK_IDLE
```

```
0000     172 ;
0000     173 ;          L F Laverdure,       11-Aug-1978
0000     174 ;          X0002 -  Return real BLK RAT bit for MT
0000     175 ;
0000     176 ;--
0000     177 ;
0000     178
```

```
                    0000    180             .SBTTL  DECLARATIONS
                    0000    181
                    0000    182     ;
                    0000    183     ; INCLUDE FILES:
                    0000    184     ;
                    0000    185
                    0000    186     ;
                    0000    187     ; MACROS:
                    0000    188     ;
                    0000    189
                    0000    190             $IFBDEF
                    0000    191             $IRBDEF
                    0000    192             $FABDEF
                    0000    193             $RABDEF
                    0000    194             $RMSDEF
                    0000    195             $ATRDEF
                    0000    196             $PSLDEF
                    0000    197             $IODEF
                    0000    198             $DEVDEF
                    0000    199             $FIBDEF
                    0000    200             $XABDEF
                    0000    201             $XABALLDEF
                    0000    202             $XABDATDEF
                    0000    203             $XABFHCDEF
                    0000    204             $XABPRODEF
                    0000    205             $XABRDTDEF
                    0000    206             $XABJNLDEF
                    0000    207             $CSHDEF
                    0000    208             $RLSDEF
                    0000    209             $FWADEF
                    0000    210
                    0000    211     ;
                    0000    212     ; EQUATED SYMBOLS:
                    0000    213     ;
                    0000    214
        00000010    0000    215             C_MAXATTR=16                    ; max. # attribute list entries / QIO
                    0000    216
                    0000    217     ;
                    0000    218     ; OWN STORAGE:
                    0000    219     ;
                    0000    220     ;
                    0000    221     ;  Argument list for XAB chain processing (allocation XABS only)
                    0000    222     ;
                    0000    223
                    0000    224     ALL_XAB_ARGS:
        00'20 14    0000    225             .BYTE   XAB$C_ALL,XAB$C_ALLLEN,XBC$C_DSPALL
        00'24 12    0003    226             .BYTE   XAB$C_DAT,XAB$C_DATLEN_V2,XBC$C_OPNDAT  ; (temporarily here)
              00    0006    227             .BYTE   0
                    0007    228
                    0007    229     ;
                    0007    230     ;  XAB scan args for other XABS requiring a READ attributes
                    0007    231     ;
                    0007    232
                    0007    233     DSP_XAB_ARGS:
        00'2C 1D    0007    234             .BYTE   XAB$C_FHC,XAB$C_FHCLEN,XBC$C_DSPFHC
        00'10 13    000A    235             .BYTE   XAB$C_PRO,XAB$C_PROLEN_V3,XBC$C_OPNPRO
        00'14 1E    000D    236             .BYTE   XAB$C_RDT,XAB$C_RDTLEN,XBC$C_OPNRDT
```

```
           00  0010              .BYTE   0
               0011
               0011      ;
               0011      ;  XAB scan args for XABS requiring modification after a READ attributes
               0011      ;
               0011
               0011      DSP_XAB_ARGS1:
   00'2C 1D    0011              .BYTE   XAB$C_FHC,XAB$C_FHCLEN,XBC$C_DSPFHC1
   00'20 14    0014              .BYTE   XAB$C_ALL,XAB$C_ALLLEN,XBC$C_DSPALL1
   00'3C 22    0017              .BYTE   XAB$C_JNL,XAB$C_JNLLEN,XBC$C_OPNJNL
   00'10 13    001A              .BYTE   XAB$C_PRO,XAB$C_PROLEN_V3,XBC$C_OPNPRO1
           00  001D              .BYTE   0
```

```
001E          .SBTTL  RMS$DISPLAY - $DISPLAY ROUTINE
001E
001E    ;++
001E    ; RMS$DISPLAY - Highest level $DISPLAY processing
001E    ;
001E    ;  This routine performs the highest level $DISPLAY processing.
001E    ;  its functions include:
001E    ;
001E    ;       1. Determine whether FAB or RAB display, and do common setup
001E    ;       2. Check for all streams idle, exiting with error if not
001E    ;       3. If this is a RAB display, just fill in RAB information available
001E    ;          from the IRAB and exit.
001E    ;       4. Allocate an attribute list work area and process the XAB chain
001E    ;       5. Do a READ of the file attributes
001E    ;       6. Reprocess the XAB chain for any XABS requiring modification
001E    ;          after the READ attributes.
001E    ;       7. Deallocate the attribute list work area
001E    ;       8. Fill in FAB fields available from the IFAB.
001E    ;       9. Check for a NAM block.  If present, fill in with information from FWA
001E    ;       10. Exit to the user, generating an AST if requested
001E    ;
001E    ;
001E    ; CALLING SEQUENCE:
001E    ;
001E    ;       Entered from EXEC as a result of user's calling SYS$DISPLAY
001E    ;       (e.g., by using the $DISPLAY macro).
001E    ;
001E    ; INPUT PARAMETERS:
001E    ;
001E    ;       AP      User's argument list addr
001E    ;
001E    ; IMPLICIT INPUTS:
001E    ;
001E    ;       The contents of the FAB or RAB and RELATED XABS.
001E    ;
001E    ; OUTPUT PARAMETERS:
001E    ;
001E    ;       R0      STATUS code
001E    ;       R1      destroyed
001E    ;
001E    ; IMPLICIT OUTPUTS:
001E    ;
001E    ;       The various fields of the RELATED XABS are filled in.
001E    ;
001E    ;       A completion AST is queued if so specified by the user.
001E    ;
001E    ; COMPLETION CODES:
001E    ;
001E    ;       Standard RMS (see functional spec for list).
001E    ;
001E    ; SIDE EFFECTS:
001E    ;
001E    ;       None.
001E    ;
001E    ;--
001E
```

```
                                 001E
                                 001E    ;++
                                 001E    ;
                                 001E    ;  Entry point for $DISPLAY service
                                 001E    ;
                                 001E    ;--
                                 001E
                                 001E            $ENTRY  RMS$DISPLAY
                                 001E            $TSTPT  DISPLAY
                                 0024
                                 0024    ;
                                 0024    ;  Decide if this is a FAB or RAB display.
                                 0024    ;
                                 0024
            58   04 AC      D0   0024            MOVL    4(AP),R8                          ; Get FAB or RAB address
                                 0028            ASSUME  FAB$B_BID EQ RAB$B_BID
                                 0028            IFNORD  #<FAB$B_BID+1>,(R8),1$            ; Structure not accessible.
               68    03     91   002E            CMPB    #FAB$C_BID,FAB$B_BID(R8)          ; Is this a display for RAB?
                     15     12   0031            BNEQ    5$                                ; Yes, RAB display
                                 0033    ;++
                                 0033    ;
                                 0033    ;  This is a FAB display.  Do common setup for FAB.  Check for Network
                                 0033    ;  operation and go do just that.
                                 0033    ;
                                 0033    ;--
                  FFCA'     30   0033            BSBW    RM$FSET                           ; do common setup
                                 0036                                                      ;  NOTE: does not return on
                                 0036                                                      ;  error
            12 69    3E     E1   0036            BBC     #IFB$V_DAP,(R9),10$               ; Check for network operation
                  FFC3'     30   003A            BSBW    NT$DISPLAY                        ; Get file attributes from
                  FFC0'     31   003D            BRW     RM$EXRMS                          ;  remote system and exit RMS
                                 0040
                                 0040    ;
                                 0040    ;  Error out if cannot read first word of the inputted structure (FAB or RAB)
                                 0040    ;
     50    000187BC 8F      D0   0040    1$:     MOVL    #RMS$_STR,R0                      ; Return structure error to user
                            04   0047            RET                                       ; and exit RMS
                                 0048    ;++
                                 0048    ;
                                 0048    ;  This is a RAB display.  Do common setup for RAB.
                                 0048    ;
                                 0048    ;--
                                 0048    5$:     $RABSET                                   ; common setup
                                 004C                                                      ;  NOTE: does not return on error
                                 004C    ;
                                 004C    ;  Supply "Wild ISI" information.  Put it into STV of user input structure.
                                 004C    ;
                                 004C    ;  Pick up, in the case of a FAB input, the ISI of the first stream which
                                 004C    ;  is connected to the file.  In the case of a RAB input, the ISI of the next
                                 004C    ;  stream which is connected to the file.  If such an ISI exists, in both cases.
                                 004C    ;  Because the top portion of both the IFAB and IRAB are similar, the same code
                                 004C    ;  can be used.
                                 004C    ;
                                 004C    ;  One is to assume that the user has called $DISPLAY with an IFI and is now
                                 004C    ;  interested in the streams connected to the file.  Returning the first ISI
                                 004C    ;  with the FAB $DISPLAY, the user will call $DISPLAY with each of the values
                                 004C    ;  returned in the STV until zero.
```

```
                        004C   364 ;
                        004C   365            ASSUME  IFB$L_IRAB_LNK  EQ IRB$L_IRAB_LNK
                        004C   366            ASSUME  IFB$W_IFI       EQ IRB$W_ISI
                        004C   367            ASSUME  FAB$L_STV EQ RAB$L_STV
                        004C   368 10$:
50    1C A9       D0    004C   369            MOVL    IFB$L_IRAB_LNK(R9),R0            ; Pick up first IRAB address
         04       13    0050   370            BEQL    20$                              ; No streams connected
50    28 A0       3C    0052   371            MOVZWL  IRB$W_ISI(R0),R0                 ; save this IRAB's ISI
                        0056   372 20$:
0C A8    50       D0    0056   373            MOVL    R0,FAB$L_STV(R8)                 ; return this ISI (or 0) in STV
                        005A   374            RMSSUC                                   ; anticipate SUCCESS
                        005D   375 ;
                        005D   376 ;  If this is a RAB input, then go to fill in the RAB information and
                        005D   377 ;  handle any RAB XAB's attached.
                        005D   378 ;
                        005D   379            ASSUME  <IFB$C_BID&1> EQ 1               ; Is this a FAB or RAB display
                        005D   380            ASSUME  <IRB$C_BID&1> EQ 0
                        005D   381            ASSUME  IFB$B_BID EQ IRB$B_BID
                        005D   382
   03 08 A9       E8    005D   383            BLBS    IFB$B_BID(R9),25$
      012A        31    0061   384            BRW     DSPRAB                           ; display RAB stuff
                        0064   385
         03       E0    0064   386 25$:       BBS     #DEV$V_DIR,-                     ; err not file structured
      03 69             0066   387                    IFB$L_PRIM_DEV(R9),30$
      00BA        31    0068   388            BRW     DSPFAB                           ; Display FAB and exit.
23 A9    02       91    006B   389 30$:       CMPB    #IFB$C_IDX,IFB$B_ORGCASE(R9)     ; is this ISAM file?
         09       12    006F   390            BNEQ    DSPXAB                           ; no, skip ISAM XABS
                        0071   391
      014F        30    0071   392            BSBW    ISAM_XABS                        ; process ISAM XABS
      03 50       E8    0074   393            BLBS    R0,DSPXAB
      0111        31    0077   394 D_XIT:     BRW     DSPXIT                           ; exit on error
                        007A   395
```

```
                     007A   397          .SBTTL  DSPXAB - Handle general, non-ISAM  XAB attributes
                     007A   398
                     007A   399  ;
                     007A   400  ;   Allocate FIB work area
                     007A   401  ;
                     007A   402
     52   40 8F   9A 007A   403  DSPXAB: MOVZBL  #FIB$C_LENGTH,R2                       ; size for work area
            FF7F'  30 007E   404          BSBW    RM$GETSPC1                             ; allocate work area
          F3 50   E9 0081   405          BLBC    RO.D_XIT                               ; get out on errors
        56   51   D0 0084   406          MOVL    R1,R6                                  ; set FIB addr
     5A   38 A9   D0 0087   407          MOVL    IFB$L_FWA_PTR(R9),R10                  ; Set up FWA pointer
             0E   BB 008B   408          PUSHR   #^M<R1,R2,R3>                ; Save regs
           FF70'  30 008D   409          BSBW    RM$GET1PAG                   ; Get scratch page
     58 AA   53   D0 0090   410          MOVL    R3,FWA$L_ATR_WORK(R10)       ;  for ATR work area
        55   53   D0 0094   411          MOVL    R3,R5                        ; Put address in R5
  01FC C3    01   D0 0097   412          MOVL    #PSL$C_EXEC,508(R3)          ; Keep exec mode byte in last lword
             0E   BA 009C   413          POPR    #^M<R1,R2,R3>                ; Restore regs
                     009E   414
                     009E   415  ;
                     009E   416  ;   Process ALLOCATION XAB, if any.
                     009E   417  ;
                     009E   418
     03 69   38   E1 009E   419          BBC     #IFB$V_SEQFIL,(R9),7$                  ; really SEQUENTIAL FILE
                     00A2   420                                                         ;  masquerading as RELATIVE?
                     00A2   421          ASSUME  <IFB$C_SEQ + 1> EQ IFB$C_REL
                     00A2   422
        23 A9    97  00A2   423          DECB    IFB$B_ORGCASE(R9)                      ; don't confuse XAB scan
  5C    FF57 CF   9E 00A5   424  7$:     MOVAB   ALL_XAB_ARGS,AP                        ; XAB scan arg. list addr
                     00AA   425  ;
                     00AA   426  ; set access mode to user before calling XAB_SCAN
                     00AA   427  ;
        85   01   B0 00AA   428          MOVW    #1,(R5)+                               ; 1 byte length
        85   2D   B0 00AD   429          MOVW    #ATR$C_ACCESS_MODE,(R5)+               ; access mode
     85   0A A9   9E 00B0   430          MOVAB   IFB$B_MODE(R9),(R5)+                   ; user mode
                     00B4   431
           FF49'  30 00B4   432          BSBW    RM$XAB_SCAN                            ; process any ALLOCATION XAB
          47 50   E9 00B7   433          BLBC    RO,DSPCLN                              ; get out on error
                     00BA   434
                     00BA   435  ;
                     00BA   436  ;   Do a read of the file attributes.  RM$XAB_SCAN has set up the attribute
                     00BA   437  ;   list, if a Allocation XAB was found.
                     00BA   438  ;
             54   D5 00BA   439          TSTL    R4                                     ; any XAB processed?
             0B   13 00BC   440          BEQL    9$                                     ; if not, R5 still points
                     00BE   441                                                         ;  to the right place - go on
           0116   30 00BE   442          BSBW    READ_ATTR                              ; go read attributes
          3D 50   E9 00C1   443          BLBC    RO,DSPCLN                              ; get out on error
                     00C4   444
                     00C4   445  ; Reset R5 pointer.  Since there is already a user-mode ATR there, use it
                     00C4   446  ;
  55   08   58 AA   C1 00C4   447          ADDL3   FWA$L_ATR_WORK(R10),#8,R5       ; set addr of work area
                     00C9   448
                     00C9   449  ;
                     00C9   450  ;   Process other XABS, if any
                     00C9   451  ;
                     00C9   452  9$:
  5C    FF3A CF   9E 00C9   453          MOVAB   DSP_XAB_ARGS,AP                        ; XAB scan arg. list addr
```

```
                FF2F'   30  00CE   454          BSBW    RM$XAB_SCAN                        ; process the XABS
                2D 50   E9  00D1   455          BLBC    R0,DSPCLN                          ; get out on error
          57  00A0 C9   9A  00D4   456          MOVZBL  IFB$B_JNLFLG(R9),R7                ; save current journal flags
                            00D9   457 ;
                            00D9   458 ; put an exec-mode ATR here for picking up jounaling stuff
                            00D9   459 ;
                85   01   B0  00D9   460          MOVW    #1,(R5)+                           ; 1 byte length
                85   2D   B0  00DC   461          MOVW    #ATR$C_ACCESS_MODE,(R5)+           ; access mode
  85    58 AA  000001FC 8F  C1  00DF   462          ADDL3   #508,FWA$L_ATR_WORK(R10),(R5)+     ; Byte that specifies exec mode
                            00E8   463
           00000000'EF   16  00E8   464          JSB     RM$RTVJNL                          ; set up attributes for journaling
                  00E6   30  00EE   465          BSBW    READ_ATTR                          ; read file attributes
                0D 50    E9  00F1   466          BLBC    R0,DSPCLN                          ; get out on error
          5C    FF19 CF  9E  00F4   467          MOVAB   DSP_XAB_ARGS1,AP                   ; FHC & ALLOCATION XAB scan args
                FF04'    30  00F9   468          BSBW    RM$XAB_SCAN                        ; process 2nd half of all or
                             00FC   469                                                     ;  FHC XAB
          00A0 C9   57   90  00FC   470          MOVB    R7,IFB$B_JNLFLG(R9)                ; restore journal flags
                             0101   471
                             0101   472 ;
                             0101   473 ;  Deallocate FIB and ATR work area
                             0101   474 ;
                             0101   475
                   3F    BB  0101   476 DSPCLN: PUSHR   #^M<R0,R1,R2,R3,R4,R5>             ; Save regs
           54   58 AA    D0  0103   477          MOVL    FWA$L_ATR_WORK(R10),R4             ; Point to work page
                FEF6'    30  0107   478          BSBW    RM$RET1PAG                         ;  and deallocate it
                58 AA    D4  010A   479          CLRL    FWA$L_ATR_WORK(R10)                ; Indicate no work area now
                   3F    BA  010D   480          POPR    #^M<R0,R1,R2,R3,R4,R5>             ; Restore regs
           52   40 8F    9A  010F   481          MOVZBL  #FIB$C_LENGTH,R2                   ; size of FIB
              54    56   D0  0113   482          MOVL    R6,R4                              ; right register to return
                    50   DD  0116   483          PUSHL   R0                                 ; save status
                FEE5'    30  0118   484          BSBW    RM$RETSPC1                         ; deallocate work space
                  50 8ED0    011B   485          POPL    R0                                 ; restore status
             03 69  38   E1  011E   486          BBC     #IFB$V_SEQFIL,(R9),DSPFAB          ; skip if not SEQ file SHARED
                23 A9    96  0122   487          INCB    IFB$B_ORGCASE(R9)                  ; back to RELATIVE disguise
```

```
                          0125   489            .SBTTL  DSPFAB - Handle FAB attributes
                          0125   490
                          0125   491 ;
                          0125   492 ;  Display (fill in) FAB associated fields which are available in the IFAB
                          0125   493 ;
                          0125   494
           63 50     E9   0125   495 DSPFAB: BLBC    R0,DSPXIT                          ; get out on error
        5A    38 A9  D0   0128   496
                          0128   497         MOVL    IFB$L_FWA_PTR(R9),R10              ; Set up FWA pointer
                          012C   498 ;
                          012C   499 ;        Note still need to handle shared file case in copying the all. quant.
                          012C   500 ;
     10 A8    70 A9  D0   012C   501         MOVL    IFB$L_HBK(R9),FAB$L_ALQ(R8)        ; Copy in allocation quantity
                          0131   502
          FECC'      30   0131   503         BSBW    RM$RET_DEV_CHAR                    ; Copy in Device Characteristics
                          0134   504
                          0134   505 ;
                          0134   506 ;       Fill in all the misc FAB fields in alphabetical order
                          0134   507 ;
                          0134   508
     3E A8    5E A9  90   0134   509         MOVB    IFB$B_BKS(R9),FAB$B_BKS(R8)        ; Copy in Bucket Size
   3C A8    0094 C9  B0   0139   510         MOVW    IFB$L_ASDEVBSIZ(R9),FAB$W_BLS(R8)        ; Copy in Block-size
     14 A8    4C A9  B0   013F   511         MOVW    IFB$W_RTDEQ(R9),FAB$W_DEQ(R8)      ; Copy in Default Extend Quant.
     16 A8    22 A9  90   0144   512         MOVB    IFB$B_FAC(R9),FAB$B_FAC(R8)        ; Copy in File access
     3F A8    5F A9  90   0149   513         MOVB    IFB$B_FSZ(R9),FAB$B_FSZ(R8)        ; Copy in Record header sz for VFC
     48 A8    64 A9  B0   014E   514         MOVW    IFB$W_GBC(R9),FAB$W_GBC(R8)        ; Copy in Global Buffer Count
   38 A8    00AC C9  D0   0153   515         MOVL    IFB$L_MRN(R9),FAB$L_MRN(R8)        ; Copy in Max record Number
     36 A8    60 A9  B0   0159   516         MOVW    IFB$W_MRS(R9),FAB$W_MRS(R8)        ; Copy in Maximum Record Size
        50    23 A9  9A   015E   517         MOVZBL  IFB$B_ORGCASE(R9),R0               ; Pick up file organization
     02 69       38  E1   0162   518         BBC     #IFB$V_SEQFIL,(R9),10$             ; skip if not SEQ file SHARED
                 50  D7   0166   519         DECL    R0                                 ; make it really SEQ
      04    04   50  F0   0168   520 10$:    INSV    R0,#FAB$V_ORG,#FAB$S_ORG,-
              1D A8       016C   521                 FAB$B_ORG(R8)                      ;  and shift over for FAB
     1E A8    51 A9  90   016E   522         MOVB    IFB$B_RAT(R9),FAB$B_RAT(R8)        ; Copy in Record attributes
     1F A8    50 A9  90   0173   523         MOVB    IFB$B_RFMORG(R9),FAB$B_RFM(R8)     ; Copy in Record Format
        50    14 BA  9E   0178   524         MOVAB   @FWA$Q_FIB+4(R10),R0               ; Get address of FIB from FWA
                 05  13   017C   525         BEQL    20$                                ; No FIB => no windows
     1C A8    03 A0  90   017E   526         MOVB    FIB$B_WSIZE(R0),FAB$B_RTV(R8)      ; Copy in Retrieval Window
     17 A8    4E A9  90   0183   527 20$:    MOVB    IFB$B_SHR(R9),FAB$B_SHR(R8)        ; Copy in Sharing bits
                          0188   528
                          0188   529 ;
                          0188   530 ;  Check for a NAM block and if present, fill in any information from the FWA
                          0188   531 ;  Fill in the NAM block and resultant name string and return any errors found.
                          0188   532 ;
                          0188   533
          FE75'      30   0188   534         BSBW    RM$FILLNAM                         ; Fill in NAM block
                          018B   535
          FE72'      31   018B   536 DSPXIT: BRW     RM$EXRMS                           ; exit RMS
                          018E   537
```

```
                        018E   539              .SBTTL  DSPRAB - Handle RAB attributes
                        018E   540      ;
                        018E   541      ;  DSPRAB - Display the RAB information into the inputted RAB from the IRAB
                        018E   542      ;
                        018E   543      DSPRAB:
  37 A8     55 A9   90  018E   544              MOVB    IRB$B_MBC(R9),RAB$B_MBC(R8)     ; Copy in Multi-block count
  36 A8     5C A9   90  0193   545              MOVB    IRB$B_MBF(R9),RAB$B_MBF(R8)     ; Copy in Multi-buffer count
                        0198   546              CASE    TYPE=B,SRC=IFB$B_ORGCASE(R10),-
                        0198   547                      DISPLIST=<SEQ,REL,ISAM>         ; Case on File organization
                        01A3   548      ;
                        01A3   549      SEQ:
                        01A3   550      REL:
  10 A8     40 A9   D0  01A3   551              MOVL    IRB$L_NRP_VBN(R9),RAB$L_RFA0(R8)        ; Copy RFA
  14 A8     44 A9   B0  01A8   552              MOVW    IRB$W_NRP_OFF(R9),RAB$W_RFA4(R8)        ;
               DC   11  01AD   553              BRB     DSPXIT                                  ; Exit from RAB display
                        01AF   554      ;
                        01AF   555      ISAM:
 10 A8    00B0 C9   D0  01AF   556              MOVL    IRB$L_UDR_VBN(R9),RAB$L_RFA0(R8)        ; Copy RFA
 14 A8    00BC C9   B0  01B5   557              MOVW    IRB$W_UDR_ID(R9),RAB$W_RFA4(R8)         ;
 35 A8    00C3 C9   90  01BB   558              MOVB    IRB$B_CUR_KREF(R9),RAB$B_KRF(R8)        ; Copy Key of Reference
                        01C1   559
               C8   11  01C1   560              BRB     DSPXIT                                  ; exit RMS
```

```
                          01C3   562          .SBTTL  ISAM_XABS - Handle Indexed file XAB attributes
                          01C3   563 ;
                          01C3   564 ;   This does SCAN for INDEXED file org SUMMARY, KEY, and AREA XAB'S
                          01C3   565 ;   RM$ALLOC_BUF needs the IFB pointer in R10.
                          01C3   566 ;
                          01C3   567
                          01C3   568 ISAM_XABS:
           55   01    7D  01C3   569          MOVQ    #1, R5                      ; 1 block buffer, no lock blb.
              FE37'   30  01C6   570          BSBW    RM$ALLOC_BUF                ; Allocate buffer, desc.
             0A 50    E9  01C9   571          BLBC    R0,50$                      ; out on allocation failure
                          01CC   572                                              ;  nothing will have been alloc
   5C   00000000'EF   9E  01CC   573 20$:     MOVAB   RM$XABOPN_ARGS,AP           ; move addr. of XAB table in AP
              FE2A'   30  01D3   574          BSBW    RM$XAB_SCAN                 ; scan XAB list
                      05  01D6   575 50$:     RSB                                 ; return - this deallocates the
                          01D7   576                                              ; buffer and desc allocated on
                          01D7   577                                              ; the call to RM$ALLOC_BUF.
```

```
                     01D7         .SBTTL  READ_ATTR - SUBROUTINE TO READ FILE ATTRIBUTES
                     01D7
                     01D7  ;++
                     01D7  ; READ_ATTR - Read file attributes
                     01D7  ;
                     01D7  ;        This routine performs an IO$_ACCESS QIO to READ the file attributes
                     01D7  ;
                     01D7  ; INPUTS:
                     01D7  ;
                     01D7  ;        R11     IMPURE AREA addr
                     01D7  ;        R10     FWA address
                     01D7  ;        R9      IFAB addr
                     01D7  ;        R8      FAB addr
                     01D7  ;        R6      FIB addr
                     01D7  ;        R5      ATTRIBUTE LIST END addr (a zero longword will be store here)
                     01D7  ;
                     01D7  ; OUTPUTS:
                     01D7  ;
                     01D7  ;        R0              STATUS
                     01D7  ;        R1-R5,AP        Destroyed
                     01D7  ;
                     01D7  ;--
                     01D7
                     01D7  READ_ATTR:
          65    D4   01D7         CLRL    (R5)                                    ; flag end of attr. list
          56    DD   01D9         PUSHL   R6                                      ; build FIB descriptor (addr)
   7E  40 8F    9A   01DB         MOVZBL  #FIB$C_LENGTH,-(SP)                     ;        "              (len)
                     01DF         SSB     #FIB$V_PRSRV_ATR,-                      ; specify real attributes (blk)
                     01DF                 FIB$L_ACCTL(R6)
                     01E3
                     01E3  ;
                     01E3  ; Push P6 and P5 QIO parameters on the STACK and do the ACCESS QIO function
                     01E3  ;
                     01E3
          00    DD   01E3         PUSHL   #0                                      ; P6 = 0
       58 AA    DD   01E5         PUSHL   FWA$L_ATR_WORK(R10)                     ; P5 = attr. list addr
    50    32    9A   01E8         MOVZBL  #IO$_ACCESS,R0                          ; I/O function code
       FE12'    30   01EB         BSBW    RM$FCPFNC_P4                            ; read attributes
       08 50    E8   01EE         BLBS    R0,10$                                  ; Did everything go ok?
                     01F1         RMSERR  ACC,R1                                  ; No, file system
       FE07'    30   01F6         BSBW    RM$MAPERR                               ;  found something wrong
    5E    08    C0   01F9  10$:   ADDL2   #8,SP                                   ; dump FIB size and address
                05   01FC         RSB
                     01FD
                     01FD         .END
```

```
$$.PSECT_EP         = 00000000            IFB$L_FWA_PTR       = 00000038
$$RMSTEST           = 0000001A            IFB$L_HBK           = 00000070
$$RMS_PBUGCHK       = 00000010            IFB$L_IRAB_LNK      = 0000001C
$$RMS_TBUGCHK       = 00000008            IFB$L_MRN           = 000000AC
$$RMS_UMODE         = 00000004            IFB$L_PRIM_DEV      = 00000000
ALL_XAB_ARGS          00000000 R     01   IFB$V_DAP           = 0000003E
ATR$C_ACCESS_MODE   = 0000002D            IFB$V_SEQFIL        = 00000038
C_MAXATTR           = 00000010            IFB$W_GBC           = 00000064
DEV$V_DIR           = 00000003            IFB$W_IFI           = 00000028
DSPCLN                00000101 R     01   IFB$W_MRS           = 00000060
DSPFAB                00000125 R     01   IFB$W_RTDEQ         = 0000004C
DSPRAB                0000018E R     01   IO$_ACCESS          = 00000032
DSPXAB                0000007A R     01   IRB$B_BID           = 00000008
DSPXIT                0000018B R     01   IRB$B_CUR_KREF      = 000000C3
DSP_XAB_ARGS          00000007 R     01   IRB$B_MBC           = 00000055
DSP_XAB_ARGS1         00000011 R     01   IRB$B_MBF           = 0000005C
D_XIT                 00000077 R     01   IRB$C_BID           = 0000000A
FAB$B_BID           = 00000000            IRB$L_IRAB_LNK      = 0000001C
FAB$B_BKS           = 0000003E            IRB$L_NRP_VBN       = 00000040
FAB$B_FAC           = 00000016            IRB$L_UDR_VBN       = 000000B0
FAB$B_FSZ           = 0000003F            IRB$W_ISI           = 00000028
FAB$B_ORG           = 0000001D            IRB$W_NRP_OFF       = 00000044
FAB$B_RAT           = 0000001E            IRB$W_UDR_ID        = 000000BC
FAB$B_RFM           = 0000001F            ISAM                  000001AF R     01
FAB$B_RTV           = 0000001C            ISAM_XABS             000001C3 R     01
FAB$B_SHR           = 00000017            NT$DISPLAY            ********    X  01
FAB$C_BID           = 00000003            PIO$A_TRACE           ********    X  01
FAB$L_ALQ           = 00000010            PSL$C_EXEC          = 00000001
FAB$L_MRN           = 00000038            RAB$B_BID           = 00000000
FAB$L_STV           = 0000000C            RAB$B_KRF           = 00000035
FAB$S_ORG           = 00000004            RAB$B_MBC           = 00000037
FAB$V_ORG           = 00000004            RAB$B_MBF           = 00000036
FAB$W_BLS           = 0000003C            RAB$L_RFA0          = 00000010
FAB$W_DEQ           = 00000014            RAB$L_STV           = 0000000C
FAB$W_GBC           = 00000048            RAB$W_RFA4          = 00000014
FAB$W_MRS           = 00000036            READ_ATTR             000001D7 R     01
FIB$B_WSIZE         = 00000003            REL                   000001A3 R     01
FIB$C_LENGTH        = 00000040            RM$ALLOC_BUF          ********    X  01
FIB$L_ACCTL         = 00000000            RM$EXRMS              ********    X  01
FIB$V_PRSRV_ATR     = 00000011            RM$FCPFNC_P4          ********    X  01
FWA$L_ATR_WORK      = 00000058            RM$FILLNAM            ********    X  01
FWA$Q_FIB           = 00000010            RM$FSET               ********    X  01
IFB$B_BID           = 00000008            RM$GET1PAG            ********    X  01
IFB$B_BKS           = 0000005E            RM$GETSPC1            ********    X  01
IFB$B_FAC           = 00000022            RM$MAPERR             ********    X  01
IFB$B_FSZ           = 0000005F            RM$RET1PAG            ********    X  01
IFB$B_JNLFLG        = 000000A0            RM$RETSPC1            ********    X  01
IFB$B_MODE          = 0000000A            RM$RET_DEV_CHAR       ********    X  01
IFB$B_ORGCASE       = 00000023            RM$RSET               ********    X  01
IFB$B_RAT           = 00000051            RM$RTVJNL             ********    X  01
IFB$B_RFMORG        = 00000050            RM$XABOPN_ARGS        ********    X  01
IFB$B_SHR           = 0000004E            RM$XAB_SCAN           ********    X  01
IFB$C_BID           = 0000000B            RMS$DISPLAY         = 0000001C RG    01
IFB$C_IDX           = 00000002            RMS$_ACC            = 0001C002
IFB$C_REL           = 00000001            RMS$_STR            = 000187BC
IFB$C_SEQ           = 00000000            SEQ                   000001A3 R     01
IFB$L_ASDEVBSIZ     = 00000094            TPT$L_DISPLAY         ********    X  01
```

```
XAB$C_ALL                       = 00000014
XAB$C_ALLLEN                    = 00000020
XAB$C_DAT                       = 00000012
XAB$C_DATLEN_V2                 = 00000024
XAB$C_FHC                       = 0000001D
XAB$C_FHCLEN                    = 0000002C
XAB$C_JNL                       = 00000022
XAB$C_JNLLEN                    = 0000003C
XAB$C_PRO                       = 00000013
XAB$C_PROLEN_V3                 = 00000010
XAB$C_RDT                       = 0000001E
XAB$C_RDTLEN                    = 00000014
XBC$C_DSPALL                      ********   X   01
XBC$C_DSPALL1                     ********   X   01
XBC$C_DSPFHC                      ********   X   01
XBC$C_DSPFHC1                     ********   X   01
XBC$C_OPNDAT                      ********   X   01
XBC$C_OPNJNL                      ********   X   01
XBC$C_OPNPRO                      ********   X   01
XBC$C_OPNPRO1                     ********   X   01
XBC$C_OPNRDT                      ********   X   01

                                                       +----------------+
                                                       ! Psect synopsis !
                                                       +----------------+

PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
.  ABS  .                       00000000  (     0.)  00 (  0.)  NOPIC   USR   CON   ABS   LCL NOSHR NOEXE NORD  NOWRT NOVEC BYTE
RMSRMS                          000001FD  (   509.)  01 (  1.)    PIC   USR   CON   REL   GBL NOSHR   EXE   RD  NOWRT NOVEC BYTE
$ABS$                           00000000  (     0.)  02 (  2.)  NOPIC   USR   CON   ABS   LCL NOSHR   EXE   RD    WRT NOVEC BYTE

                                                    +------------------------+
                                                    ! Performance indicators !
                                                    +------------------------+

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                    29    00:00:00.08    00:00:00.58
Command processing               112    00:00:00.76    00:00:04.84
Pass 1                           504    00:00:19.86    00:00:42.40
Symbol table sort                  0    00:00:03.13    00:00:03.59
Pass 2                           123    00:00:03.71    00:00:07.43
Symbol table output               17    00:00:00.18    00:00:00.35
Psect synopsis output              1    00:00:00.01    00:00:00.15
Cross-reference output             0    00:00:00.00    00:00:00.00
Assembler run totals             788    00:00:27.73    00:00:59.34

The working set limit was 1650 pages.
112391 bytes (220 pages) of virtual memory were used to buffer the intermediate code.
There were 120 pages of symbol table space allocated to hold 2200 non-local and 16 local symbols.
623 source lines were read in Pass 1, producing 15 object records in Pass 2.
39 pages of virtual memory were used to define 38 macros.
```

```
                                        +----------------------------+
                                        ! Macro library statistics !
                                        +----------------------------+

Macro library name                       Macros defined
------------------                       --------------
_$255$DUA28:[RMS.OBJ]RMS.MLB;1                      23
_$255$DUA28:[SYS.OBJ]LIB.MLB;1                       2
_$255$DUA28:[SYSLIB]STARLET.MLB;2                    9
TOTALS (all libraries)                              34

2370 GETS were required to define 34 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS$:RMS0DISPL/OBJ=OBJ$:RMS0DISPL MSRC$:RMS0DISPL/UPDATE=(ENH$:RMS0DISPL)+EXECML$/LIB+LIB$:RMS/LIB
```

0329 AH-BT13A-SE
VAX/VMS V4.0

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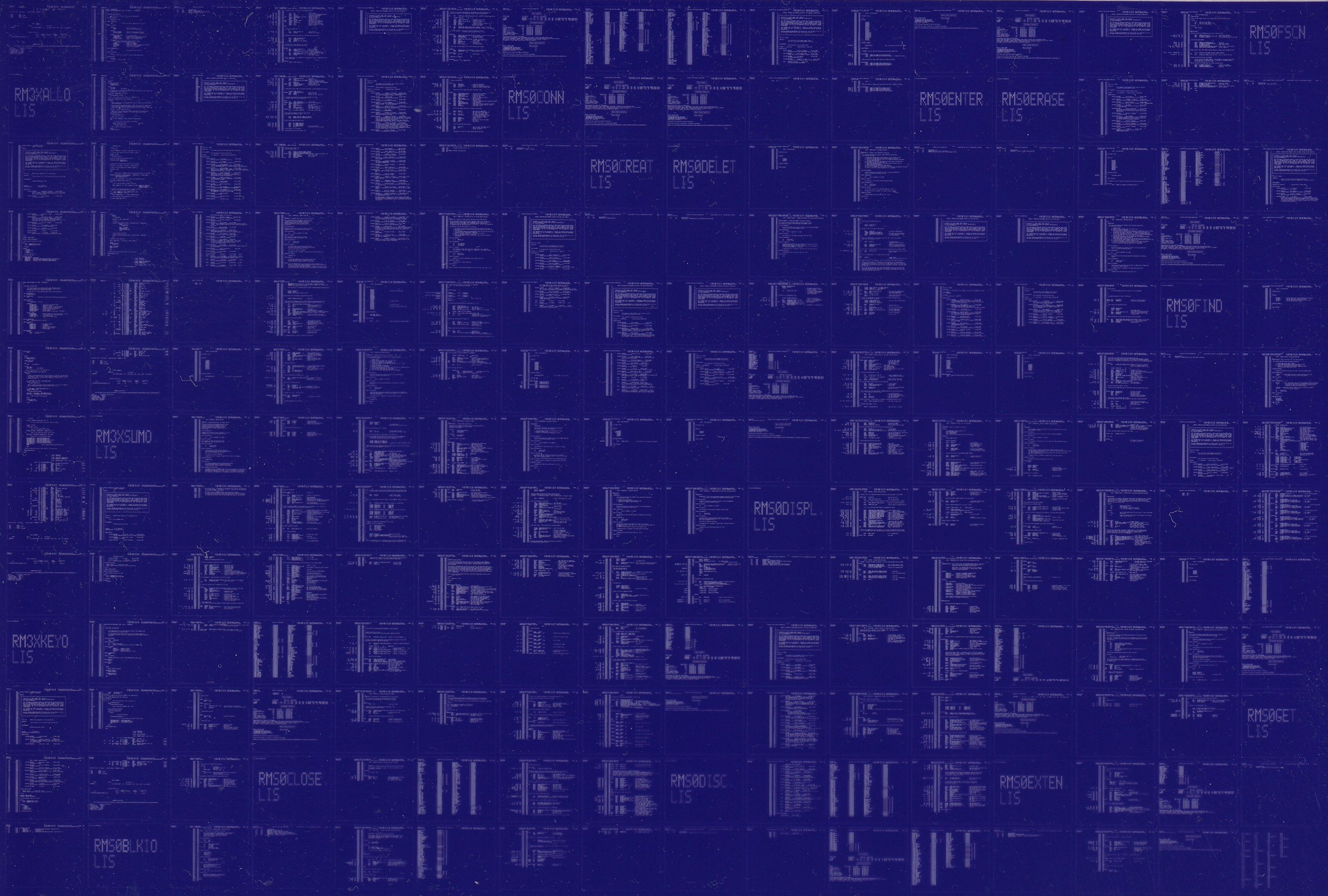

RMS0FSCN
LIS

RM3XALLO
LIS

RMS0CONN
LIS

RMS0ENTER
LIS

RMS0ERASE
LIS

RMS0CREAT
LIS

RMS0DELET
LIS

RMS0FIND
LIS

RM3XSUMO
LIS

RMS0DISPL
LIS

RM3XKEYO
LIS

RMS0GET
LIS

RMS0CLOSE
LIS

RMS0DISC
LIS

RMS0EXTEN
LIS

RMS0BLKIO
LIS